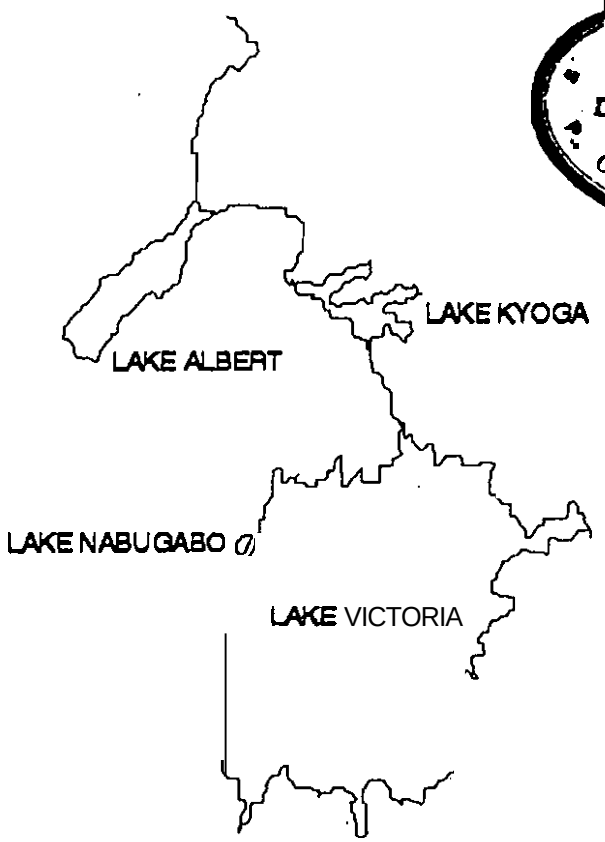
The Biology, Ecology, Management and Conservation of the Fisheries of Victoria, Kyoga Nabugabo

Nile Perch (Uganda) Project: 3-P-86-0137
Technical Report



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CHAPTER VI

The Biology, Ecology, Distribution and Conservation of Surviving haplochromine cichlids in Lakes Victoria, Kyoga and Nabugabo

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Introduction

Haplochrmine cichlids were the most abundant taxa in Lakes Victoria, Kyoga and Nabugabo prior to introduction of the Nile perch. As stocks of the introduced predator increased, these taxa were depleted to such an extent that they are now virtually absent from the lake.

The haplochromine cichlids played an important role in the ecology of Lakes Victoria, Kyoga and Nabugabo. They occupied virtually all trophic levels in the lake and facilitated an efficient flow of energy through the ecosystem. Their depletion seem to have left much organic matter whose decomposition has contributed to accumulation of dead organic matter which may be contributing to prolonged anoxia in Lake Victoria. The haplochromines formed an important small-scale fishery. Fishermen formerly subsisting on this fishery have been driven out of business because they cannot afford the expensive nets required for Nile perch fishery. In addition to providing a cheap source of fish protein to humans, the species were an important source of Scientific material for students of genetics antd adaptive radiation.

Objectives

The main objective of this study was to assess the changes in the composition of haplochromine species flock and examine their biology, ecology and distribution so as to design measures for conservation and enhancement of this taxa by examining the following specific objective:

i. make an inventory of the surviving haplochromine cichlids.
ii. determine the distribution of t·he surviving haplochromine species so as to determine factors that facilitate survival of these haplochromine species ego refugia
iii. examine the food and feeding habits of the surviving haplochromines and how this overlaps with that of other fish species
iv. recommend measures for conserVation of the surviving haplochromines

Hypothesis:

In lakes to which *Lates* occur naturally, haplochromine species have been shown to be restricted to inshore areas with either rocky outcrops or marginal vegetation. It was therefore hypothesised that the species of haplochromines surviving in Lakes Victoria, Kyoga and Nabugabo are those that occurred in areas with such refugia and whose food would normally occur within their habitats.

study Areas, Material and Methods

Data were collected from Lakes Victoria, Kyoga, Albert, Nabugabo and from three satelite lakes around Lake Nabugabo (Lakes Manywa, Kayanja and Kayugi).

On Lake Victoria the areas sampled included Napoleon Gulf, Buvuma Channel around Rwamafuta Island, and at Bugaia Island. In each of these areas, three habitats types were studied. These were: inshore areas with macrophyte cover in Napoleon GUlf, Areas with rocky outcrops around Jinja pier, Rwamafuta island, and Bugaia-Kijaka, Selected open water sites, and beaches.

On Lake Kyoga, it was again inshore areas with macrophyte cover and selected open water stations. The sampling sites on Lake Nabugabo included: areas with and without macrophyte cover and open water and beaches. There were no rocky outcrops on Nabugabo. Three small lakes around Nabugabo were sampled extensively. Sampling on Lake Albert was concentrated insore and covered areas with and without marginal vegetation.

Samples were collected using gillnets, seine nets, minnow traps and trawling. The types of fish caught in each sampling gear were recorded. A sample of haplochrom(ne species was photographed preserved, and identified in the laboratory.

Results and Discussion

This work also started towards the end of the Nile perch project and the current results can be considered preliminary.

Food and feeding

The most common trophic groups encountered in all lakes were in order of .importance: insectivores, piscivores, molluscivores and zooplanktivores (Table 1-4). One paedophage, *Astatotilapia barbarae,* was also recovered from Lake Victoria. The majority of insectivores belonged to the generalized type haplochromine of the genus *Astatotilapia.* While three of these: *A. nubila, A. megalops* and *A. barbarae* were positively identified, many of the species in this genus are still unidentified. Prior to the establishment of the Nile perch insectivores comprised between 20 and 70% of total numbers in Lake Victoria (Witte 1981). Because of their relatively large adult size these fishes were more prone to predation by the Nile perch. This has left this trophic level under-utilized resulting in especially large swarms of lake flies common in this lake. Insects as .1 food to the haplochromines does not require specialised anatomical structure to .be fed on. Thus all other trophic groups have reverted to this food source either as supplement or as the main food source. *A. barbarae,* a paedophage, was found to have eaten insect larvae possibly due to the now scarcity of cichlid eggs. Specimens of the haplochromines recovered from other lakes also like in Lake Victoria, fed on insects which are abundant.

Distribution:

With the exception of zooplanktivores *Yssichromis*

laparogramma, and *A. megalops* in Lake Victoria, the piscivore *Prognathochromis venator* and the insectivores *Astatotilapia velifer* and *Gaurochromis simpsoni* from the Nabugabo lakes and the piscivore *Serranochromis guarti* and the insectivore *Astatotilapia latifasciata* which were caught in open waters, most haplochromines encountered were captured inshores. These were near or among either macrophytes or *rocky* outcrops. *"A. velifer, A. latifasciata* and *G. simpsoni* were however also recovered from inshore macrophytes giving them lake-wide distribution.

One common feature about the hapJ,ochromines that seem to be surviving is that either these species were originally confined or lived near structural refugia (marginal macrophytes and rocky outcrops) or had a wide distribution which included these refuge areas (Witte et al.1992). The exceptiCln to this observation is only found among the zooplanktivores which are pelagic. The predatory Nile perch apparently is not very efficient at capturing pelagic fishes as it has failed to eliminate another pelagic zooplanktivore *Rastrineobola argentea.* The structural refugia (rock crvices, very shallow waters and aquatic macrophytes) are inaccessible to the Nile perch. Such areas should be gazetted for conservation in order to enhance the recovery of the haplochromines into the fishery.

Recent observations have shown that haplochromine species have recovered rapidly in lake Kyoga. The availability of the water hyacinth has not only provided cover against predation but is likely to have allowed haplochromine populations which have survived in small isolated populations to come together and breed more successfully.

References

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Table 1. The list of haplochromines species encountered in Lake Victoria

Species	Habitat	Food
Astatoreochromis allualldi	rocky outcrops & inshore macrophytes	insects only
Astatotilapia nubila	inshore macrophytes	insects only
Psammochromis saxicola	rocky outcrops	mainly insects, few molluscs
Ptyochromis sauvagei	rocky outcrops	mainly molluscs, few insects
~~*Enterochromis*~~ Neochromis ***nigricans***	rocky outcrops	mainly insects, few algae
Harpagochromis nyanzae	inshore macrophyte	piscivore
Prognathochromis dolichorhynchus	rocky outcrops	piscivore
Astatotilapia megalops	open water	zooplanktivore
Yssichromis laparogramma	open water	zooplanktivore
Psammochromis aelocephalus	macrophyte	insects only
Astatotilapia barbarae	inshore macrophyte	paedophage
Many unidentified *Astatotilapia* sp	inshore macrophyte	insects

Table 2. The list of haplochromine species encountered in Lake Kyoga

Species	Habitat	Food
Astatoreochromis alluaudi	inshore macrophyte	insects only
Astatotilapia nubila	inshore macrophyte	insects only
Astatotilapia latifasciata	lakewide	insects only
Serranochromis guarti	open water	piscivore
Pyxchromis orthostoma	inshore macrophyte	piscivore

Table 3. The list of haplochromine species encountered in Lakes Nabugabo, Kayugi , Manywa and Kayanja

Lake & Species	Habitat	Food
Nabugabo:		
Astatoreochromis alluaudi	inshore macrophytes	insects only
Astatotilapia nubila	inshore macrophyte	insects only
Paralabidochromis beadlei	sandy beach with macrophyte	insects only
Haplochromis annectidens	inshore macrophyte	insects only
Astatotilapia velifer	lakewide	insects only
Gaurochromis simpsoni	lakewide	insects only
Pseudocrenilabrus multicolor	inshore macrophyte	insects only
Kayanja, Kayugi, Manywa:		
Prognathochromis venator	inshore macrophyte	insects only
Astatoreochromis alluaudi	inshore.macrophyte	insects only
Astatotilapia nubila	inshore macrophyte	insects only
Pseudocrenilabrus mUlticolor	inshore macrophyte	insects only
Gaurochromis simpsoni	lakewide	insects only
Astatotilapia velifer	lakewide	insects only

Table 4. The list of haplochromine species encountered in Lake Albert

Species	Habitat	Food
Thoracochromis avium	inshore macrophyte	mainly molluscs, few fish remains
Thoracochromis loati	inshore macrophyte	insects only
Thoracochromis wingatii	inshore macrophyte	insects only